

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (DD-MM-YYYY) 05-02-2008		2. REPORT TYPE Final		3. DATES COVERED (From - To) 01APR2004 to 1June2007	
4. TITLE AND SUBTITLE “Deriving a Computational Theory of Visual Spatial Attention”				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER FA9550-04-1-0225	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Professor Snerling				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Air Force Office of Scientific Research/NL 875 N Randolph St, Ste 325 Arlington, VA 22203				10. SPONSOR/MONITOR'S ACRONYM(S) AFOSR	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) AFRL-SR-AR-TR-08-0101	
12. DISTRIBUTION / AVAILABILITY STATEMENT Distribution A: Approved for Public release					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT This research effort developed a computational theory for the control of human attention in two-dimensional visual tasks. Theory and experiments focused on the role of the spatial modulation transfer function for human vision, and on the characteristics and limitations of cortical receptive field processes.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (include area code)

Final Report for:
Prof. George Sperling
“Deriving a Computational Theory of Visual Spatial Attention”
University of California, Irvine

AFOSR Grant No. FA9550-04-1-0225
Period of Performance ended 31 December 2006

This research effort developed a computational theory for the control of human attention in two-dimensional visual tasks. Theory and experiments focused on the role of the spatial modulation transfer function for human vision, and on the characteristics and limitations of cortical receptive field processes. As background, three distinct neural systems are considered. These systems, relevant to motion detection, object recognition, and selective attention have been determined in previous AFOSR-supported research. The first two systems operate monocularly. The third system operates with binocular vision and constructs depth perception from stimulus motion. The current project represents the attentional system as a linear space-invariant mechanism that implements a kind of spatial-frequency gain control over the visual field. The system that controls the spatial distribution of this gain can be approximated by a low-pass filter. The experimental portion of this research estimated and tested properties of this filter. These results enable a transfer function to be identified, giving the amplitude of the modulation of attention across visual space. There are many scientific and practical applications of this formulation, which has been presented in several peer-reviewed scientific journals. One example application is that, given any task-dependent visual requirements, the transfer function should suffice to compute the best possible spatial control of attention for the task.